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Usability User Interface Analysis on Tokopedia Mobile Application Using Heuristic Evaluation Method

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Abstract**—** *The development of the e-commerce sector in Indonesia is accompanied by many mobile applications that make transactions easier for users. In its use, the user interface is an important component as a means of interaction between humans and the system. This study aims to analyze the usability value of the user interface according to ten heuristic aspects. This research approach uses quantitative methods, with the Heuristic Evaluation method. Data collection was carried out by distributing online questionnaires to 100 respondents who used the Tokopedia application. The results showed that the overall website quality assessment gave a positive response and showed that usability, information quality, and service interaction affected user satisfaction.*

Keywords— *E-Commerce, Heuristic Evaluation, Usability, User Interface.*

I. INTRODUCTION

The rapid development of technology has influenced people's behavior, especially in buying and selling transactions. Along with the increasing use of smartphones that facilitate user mobility, e-commerce has now developed into m-commerce where business activities can now be accessed through smartphone devices. The development of e-commerce in Indonesia has had a positive impact on businesses, consumers, and society. For business people, e-commerce has a positive impact in the form of reducing operational costs and can expand market share, so that profits can be maximized and it is easier in terms of business development [1]. In terms of demographics, online shopping preferences are dominated by the millennial generation, namely the age of 24-39 years as many as 46.7 million or 17 percent, followed by generation X, namely the age of 40-55 years with 21 million or 13% [2]. From the survey results, it can be seen that the demographics of e-commerce users in Indonesia are quite high. There are several factors that determine how to increase the success of e-commerce, namely the choice and value of an attractive and competitive product, performance and service, the look and feel of a website or application page, advertising and incentives, personal attention, community relations, and security and reliability [3]. The user interface or user interface is one of the factors that determine the increase in traffic on a website or application because users interact with programming logic through the user interface [4]. The user interface is the point of human-computer interaction and communication on the device [5]. The user interface is also a term used to describe the appearance of a machine or computer that interacts directly with the user [6]. The usability measurement is needed to find out the extent to which a product can be used by users in achieving certain goals effectively, and efficiently and user satisfaction when using the application can be achieved [7].

There are several studies related to usability testing on mobile user interfaces. Putu [8] analyzes the usability level on the UNDIKSHA website using the heuristic evaluation method using 10 usability variables in determining the UNDIKSHA website layout design that meets the usability criteria. Usability testing of the website using Heuristic Evaluation was also carried out by Ayu [9], this research aimed to analyze the usability of the iBadung mobile application. This study aims to measure the level of user comfort, application feasibility, and application interface of the iBadung mobile application. The test was carried out by filling out questionnaires by 17 respondents with categories of lay users, ordinary users, and administrator users. This research produces recommendations for improving the appearance of the iBadung mobile application. Another analysis of the Banyuwangi Online Akta [10] website is intended to determine the usability, efficiency, and effectiveness of the interface to the technology used on the Banyuwangi Online Akta website. This study resulted in 10 principles of Heuristic Evaluation that have been used, 7 principles that do not require improvement, and 3 principles that have problems and produce recommendations for improvement. Furthermore, the methodology will be discussed in section 2 along with the results and conclusions in chapters 3 and 4.

II. THEORETICAL BASIC

A. *E-Commerce*

E-commerce is the activity of distributing, selling, purchasing, marketing products (goods and services), by utilizing telecommunications networks such as the internet, television, or other computer networks.

B. *Heuristic Evaluation*

Heuristic Evaluation is an evaluation system for user-based computer software. Heuristic Evaluation is a usability evaluation method to improve a design effectively using a set of heuristic principles.

C. *Usability*

Usability or usability is the extent to which a product can be used by users in achieving certain goals effectively, efficiently and user satisfaction when using the application can be achieved.

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D. User Interface

User interface is a term used to describe the appearance of a machine or computer that interacts directly with the user.

III. Research Method

A. Method of Research

This research consists of several stages, namely determining the object of research, preparing research instruments, collecting data, analyzing data, and recommending the results of the analysis. The object of research used in this study is the Tokopedia mobile application. At the stage of preparing the instrument, it was determined that the form of the instrument used in this study was a questionnaire in the form of a questionnaire. The data collection stage is carried out online in the form of a Google Form. The number of samples in this study was 100 respondents, this is because in descriptive research the minimum sample size is 100. After the data is collected, then it is processed and analyzed using SPSS 20 software. The processed data can then be used as recommendations in the form of recommendations for analysis results [11].

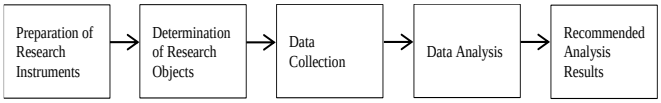

Fig. 1. The Flow of Research Stages

B. Variables

There are 10 variables used in this study taken from the Heuristic Evaluation method. Heuristics is a complete set of guidelines and is proven to produce good interface design [12]. Heuristic Evaluation helps identify usability problems in interface design by examining the appearance of the interface. All Heuristic variables can be notified with the letter X which consists of Visibility of system status (X1), Match between the system and the real world (X2), User control and freedom (X3), Consistency and standards (X4), Error prevention (X5), Recognition rather than recall (X6), Flexibility and efficient of use (X7), Aesthetic and minimalist design (X8), Help users recognize, dialogue, and recovers from errors (X9), Help and documentation (X10) [13]. These variables are then grouped based on the points and statements submitted in the questionnaire.

C. Variable Measurement Scale

The questionnaire used in this study is a questionnaire with a Likert scale model. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena [14]. In measuring the variables, a Likert scale is used with the levels described in table 1 below.

It can be seen in Table 1 that the Likert scale has a gradation from very positive to negative which can be in the form of scores or words. With the Likert Scale, the measured variables are translated into variable indicators which are then used as benchmarks for compiling items in the form of questions or statements.

TABLE I. Likert Scale

No	Description	Weight
1	Strongly agree	5
2	Agree	4
3	Neutral	3
4	Don't agree	2
5	Strongly Disagree	1

D. Usability Measurement Scale

Usability analysis is done by calculating the percentage of answers from respondents. Each statement represents a variable contained in the heuristic principle. The range used in measuring usability according to [15] can be described in table 2 below.

TABLE II. Usability Measurement Scale

No	Score	Qualification	Result
1	85-100%	Very good	Succeed
2	65-84%	Well	Succeed
3	55-64%%	Pretty good	Not successful
4	0-54%	Not good	Not successful

E. Data Testing and Analysis

For testing and data analysis in this paper use:

1. Instrument Test: In this stage, testing is carried out to obtain information about the quality of the instrument and whether it has met the requirements.
2. Validity and Reliability Test: In this stage, 10 heuristic variables are tested, the validity test aims to determine whether the variables used in the study are valid and have good reliability.

IV. Results and Discussion

A. Analysis Results

The following describes the results of the percentage calculation which are then qualified based on the range for usability measurement in table 3.

TABLE III. Test Results

Variable	N	Percentage	Description
X1.1	100	84%	Strongly agree
X1.2	100	79%	Agree
X1.3	100	86%	Strongly agree
X2.1	100	85%	Strongly agree
X2.2	100	86%	Strongly agree
X3.1	100	80%	Strongly agree
X3.2	100	86%	Strongly agree
X4.1	100	85%	Strongly agree
X4.2	100	83%	Strongly agree
X5.1	100	84%	Strongly agree
X5.2	100	80%	Strongly agree
X6.1	100	83%	Strongly agree
X6.2	100	81%	Strongly agree
X6.3	100	86%	Strongly agree
X7.1	100	85%	Strongly agree
X7.2	100	88%	Strongly agree
X8.1	100	81%	Strongly agree
X8.2	100	85%	Strongly agree
X9.1	100	82%	Strongly agree
X9.2	100	82%	Strongly agree
X10.1	100	86%	Strongly agree
X10.2	100	81%	Strongly agree
X10.3	100	79%	Agree
X10.4	100	83%	Strongly agree

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B. Validity Results

The validity test is used to measure the accuracy between the data that occurs on the object and the data reported by the researcher. The following are the results of the validity test of 10 variables as presented in table 4.

TABLE IV. Validity Test Results

Variable	Correlation Value	R Table	Description
X1.1	0,681	0,196	Valid
X1.2	0,786	0,196	Valid
X1.3	0,698	0,196	Valid
X2.1	0,825	0,196	Valid
X2.2	0,800	0,196	Valid
X3.1	0,814	0,196	Valid
X3.2	0,796	0,196	Valid
X4.1	0,851	0,196	Valid
X4.2	0,895	0,196	Valid
X5.1	0,833	0,196	Valid
X5.2	0,792	0,196	Valid
X6.1	0,829	0,196	Valid
X6.2	0,879	0,196	Valid
X6.3	0,779	0,196	Valid
X7.1	0,855	0,196	Valid
X7.2	0,835	0,196	Valid
X8.1	0,937	0,196	Valid
X8.2	0,905	0,196	Valid
X9.1	0,896	0,196	Valid
X9.2	0,896	0,196	Valid
X10.1	0,724	0,196	Valid
X10.2	0,855	0,196	Valid
X10.3	0,843	0,196	Valid
X10.4	0,841	0,196	Valid

C. Reliability Results

A reliability test is conducted to test the consistency of the measuring instrument, and whether the results are consistent if the measurement is repeated. The following are the results of the reliability test of 10 variables as presented in Table 5.

TABLE V. Reliability Test Results

Variable	N	Percentage	Description
Visibility of System Status	0,787	0,196	Reliable
Match Between System and the Real World	0,841	0,196	Reliable
User Control and Freedom	0,835	0,196	Reliable
Consistency and Standards	0,878	0,196	Reliable
Variable	**N**	**Percentage**	**Description**
Error Prevention	0,841	0,196	Reliable
Recognition Rather than Recall	0,838	0,196	Reliable
Flexibility and Efficiency of Use	0,863	0,196	Reliable
Aesthetic and Minimalist Design	0,903	0,196	Reliable
Help Users Recognize, Diagnose, and Recover from Errors	0,892	0,196	Reliable
Help and Documentation	0,820	0,196	Reliable

D. Usability Tests Results

Usability analysis is done by calculating the percentage of answers from respondents and measuring using the percentage of eligibility formula. The percentage value is in the form of a quantitative value which is then used for the calculation results based on the Range used to measure Usability [6] in Table 6.

E. Variable Calculation Results

Usability analysis is done by calculating the percentage of answers from respondents and measuring using the percentage of eligibility formula. The calculation results are described in Table 7.

TABLE VI. Usability Test Results

Score	Qualification	Results
85-100%	Very good	Succeed
65-84%	Well	Succeed
55-64%%	Pretty good	Not successful
0-54%	Not good	Not successful

TABLE VII. Variable Calculation Results

Variable	N	Percentage	Description
X1.1	100	84%	Baik
X1.2	100	79%	Baik
X1.3	100	86%	Sangat Baik
X2.1	100	85%	Sangat Baik
X3.1	100	80%	Baik
X3.2	100	86%	Sangat Baik
X4.1	100	85%	Sangat Baik
X4.2	100	83%	Baik
X5.1	100	84%	Baik
X5.2	100	80%	Baik
X6.1	100	83%	Baik
X6.2	100	81%	Baik
X6.3	100	86%	Sangat Baik
X7.1	100	85%	Sangat Baik
X7.2	100	88%	Sangat Baik
X8.1	100	81%	Baik
X8.2	100	85%	Sangat Baik
X9.1	100	82%	Baik
X9.2	100	82%	Baik
X10.1	100	86%	Sangat Baik
X10.2	100	81%	Baik
X10.3	100	79%	Baik
X10.4	100	83%	Sangat Baik

F. Recommended Analysis Results

Based on the level of respondents' approval of the questionnaire in table, it can be seen that 2 points get a description of "Agree" namely the Visibility of System Status variable with the statement "The Tokopedia application always tells users what the system is doing" and on the Help and documentation variable with the statement "The Help feature on the Tokopedia Application helps users learn and complete everything related to the system". The results of the recommendations are described in the following table 8:

TABLE VIII. Validity Test Results

Statement	Recommendation
The Tokopedia application mobile always tells users what the system is doing.	This aspect is found on the Notifications page where the user cannot know which transaction process is in progress. Recommendations from users are to add pop-up notifications for each ongoing process to make it easier for users to know what tasks have been completed.
The Help feature on the Tokopedia Application helps users learn and complete everything related to the system.	This aspect is found on the Tokopedia Care page where on this page the main focus of assistance is on popular questions and frequently asked questions. The recommendation from users is to add a button that is directly connected to the customer service

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V. CONCLUSION

Based on the results of the analysis of research that has been carried out on the Tokopedia application using the Heuristic Evaluation method, it can be concluded as follows:

1. The instruments used in this study are 10 variables consisting of 10 heuristic principles, namely Visibility of system status, Match between the system and the real world, User control and freedom, Consistency and standards, Error prevention, Recognition rather than recall, Flexibility and efficient of use, Aesthetic and minimalist design, Help users recognize, dialogue, and recovers from errors, Help and documentation and the results are all valid and reliable variables.
2. The usability level of the Tokopedia application interface is in accordance with the 10 heuristic principles, namely 92% of respondents responded "Strongly Agree" and 8% responded, "Agree". The average score for the usability level of the Tokopedia application user interface is above 85%, meaning that it is in accordance with the 10 heuristic principles.
3. The results of the usability test analysis showed 2 statements that obtained the respondent's level of agreement "Agree" namely "The Tokopedia application always tells users what the system is doing" and "The Help feature on the Tokopedia application helps users learn and complete everything related to the system". Recommendations from users are to add pop-up notifications for each ongoing process to make it easier for users to find out what tasks have been completed and add buttons that are directly connected to customer service.

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